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VOLVO 2000 LCP PROTOTYPE CAR OF FUTURE INTRODUCED

Helsinki HUFVUDSTADSBLADET in Swedish 14 Oct 83 p 17

[Article by Borje Forsten]

[Text] There are getting to be more and more "cars of the future"--some (and undoubtedly a great many) only on paper, some in the design stage, and some in drivable condition and incorporating solutions that will gradually appear in the new car models being poured onto the market by the auto manufacturers. The latest addition to the cars of the future is the Volvo 2000 LCP ("2000" refers to the year, and "LCP" is an abbreviation for "Light Component Product"). It was developed by a group that included the well-known Rolf Mellde as project leader and a handful of experts from Volvo. There was also international cooperation with experts on various materials.

The Volvo 2000 LCP is now ready to be introduced and pondered over, and that is what happened this past week in Goteborg.

"The purpose of Volvo's LCP study was not to come up with a new car model, so it is scarcely likely that the Volvo 2000 LCP will ever be mass-produced," said Rolf Mellde as he described the project he has headed since 1979.

"This has certainly been my most interesting assignment during the 36 years that I have worked in the auto industry," said Mellde, who at one time was known as "Mr Saab." It was he who designed the first Saab car, which was introduced in 1947. In 1971, Mellde went over very unexpectedly to Volvo for reasons that he will not disclose even now. He was later followed by some of his old buddies, one of whom--Bjorn Andersson--has been working in the LCP group. They both say: "We had almost a completely free hand to do what we wanted, as long as we produced results."

And the result is four drivable experimental cars and 500 progress reports totaling about 5,000 pages.

Four Studies

The project was based on four main studies, and the common denominator in all of them was low energy consumption.

The first study was aimed at determining what type of vehicle would best meet customer expectations in the future, and the project group came to the conclusion that the car should seat two people and have a large luggage area or, as an alternative, room for one or two additional passengers.

The second study was concerned with engine types, both those already in existence and those in the making. The evaluations, which were made in cooperation with two different firms, covered not only today's piston engines (Otto and diesel), but also gas turbines, hybrid engines, Stirling engines, and electric or steam engines. The unanimous decision was that the best choice would be a three-cylinder turbocharged diesel engine with direct fuel injection, combined with a transmission having a very wide range of gear ratios.

Rolf Mellde said: "Two different types of three-cylinder fuel-injected diesel engine were tested and evaluated. One of them is very light with a magnesium cylinder head, and the other is a heat-insulated cast-iron engine with good multifuel capabilities. In some of the experimental cars, the last-mentioned engine runs entirely on colza oil."

Magnesium

A thorough study was made concerning materials that might be considered for use, and it covered not only materials already being used in the automobile industry but also primarily lightweight materials considered likely to come into increasing use in the auto industry over the next 15 years.

The latter include magnesium, which is considerably lighter than aluminum and which is already being used in the aircraft industry, as one example.

One thing that can be said about magnesium is that 1 cubic meter of sea water yields 1.3 kilograms of it, so there is no shortage of raw material!

In the LCP project, the following components were made of magnesium: engine block, intake manifold, engine bracket, subframe, steering column support, rear support shaft, mounting plate for the A post, and wheel rims. Seven percent (about 50 kilograms) of the material used in the experimental cars is magnesium.

Costs

The fourth study was aimed at finding answers to two questions: what is the cost that can be considered reasonable for each 1-kilogram reduction in weight and how important is energy efficiency to the consumer?

There were a large number of variables, and the group eventually came up with a mathematical formula that was used throughout the project.

After the studies were concluded and analyzed, it was possible to lay down the broad outlines for the experimental cars. It was decided that they would have a curb weight of 700 kilograms, a front area of not more than 1.8 square meters, a top speed of at least 150 kilometers per hour, an acceleration from 0 to 100

kilometers per hour in no more than 12 seconds, and fuel consumption of not more than 4 liters per 100 kilometers in mixed driving, with all exhaust and safety regulations being complied with.

Front-Wheel Drive

The experimental cars have their engines and transmissions in front, front-wheel drive, plenty of space in the front seat, a rigid beam from post to post immediately behind the front seats, and a large, 1,000-liter luggage area.

The solution chosen also allows extra passengers plenty of room, although they have to ride backwards.

The highest priority went to energy efficiency. The LCP car's energy consumption during a "lifetime" of 10 years--which is somewhat on the short side--turned out to be 82,500 kWh.

The corresponding figure for medium-sized cars averages 136,000 kWh.

Those figures include the energy required to produce the materials and during the production process, as well as an annual driving distance of 15,000 kilometers over 10 years. The LCP car's energy consumption is therefore almost 50 percent lower.

Fuel consumption is also extremely low. At constant speeds of 50 and 70 kilometers per hour, consumption was 2.35 liters per 100 kilometers.

The experimental cars reached a top speed of 180 kilometers per hour, with acceleration from 0 to 100 kilometers per hour in 11 seconds.

Technical Data

The experimental cars are 3.98 meters long, 1.65 meters wide, and 1.3 meters high. They have a wheelbase of 2.54 meters, a front track of 1.45 meters, and a rear track of 1.40 meters. The car weighs 707 kilograms, and the weight distribution between front and back is 64/36. The fuel tank holds 34 liters, or enough to travel 1,000 kilometers. The air resistance value is 0.25-0.28.

Suspension uses the hydragas system, and there is independent wheel suspension (with transverse links in the front and trailing arms in the rear). Steering is of the rack-and-pinion type, with an adjustable steering wheel (adjusting the steering wheel automatically adjusts the instrument panel as well). The turning diameter is 9.9 meters. The front wheels have disc brakes, while the rear wheels have drum brakes.

Two Engines

Basically, two engines were produced. The first is a three-cylinder fuel-injected turbocharged diesel engine (1.3 liters). It develops 39 kW at 4,300 rpm and has a maximum torque of 90 N-m at 3,400 rpm. The cylinder block is made of magnesium, the cylinder head of aluminum. It is water-cooled and has a Garret T2 turbosystem. The engine weighs 98 kilograms.

The second engine is a three-cylinder heat-insulated fuel-injected turbodiesel with multifuel capabilities and a cylinder capacity of 1.4 liters. In this case, the output is a full 66 kW at 4,500 rpm, and torque is 165 N-m at 3,000 rpm. The engine is made of cast iron, is oil-cooled, and has a KKK K21 turbosystem, meaning that it can be operated even on colza oil. The engine weighs 130 kilograms.

Vibration

Driving tests showed that the three-cylinder diesel engine caused unacceptable vibration and noise levels inside the car at less than 1,500 rpm. The five-speed manual transmission was also not entirely satisfactory. The project group is therefore working with a CVT box with a very high gear reduction.

Vibrations and noise can be effectively counteracted using an extra flywheel that rotates in the opposite direction from the engine's ordinary flywheel, says Rolf Mellde. He also emphasizes that the LCP cars should be called experimental cars rather than prototypes because the purpose in building them was to enable the group to test and evaluate various systems and materials. There are no plans whatever for future production.

Rolf Mellde says: "On the other hand, certain components may be introduced rather quickly into current production. Examples would be parts of the plastic body we used, the side windows of very strong plastic, and so on."

Fast Assembly

One major reason why the LCP car consumes so little energy overall is that assembly takes place so fast. The LCP group chose to refine the platform concept, which has many advantages.

The platform, which constitutes a supporting lower shell, consists of the floor, cross members, wheel housings, and center panel. The lower shell is assembled on a separate production line, and all the fittings are then added to it: seats, panels, instrument panel, steering mechanism, and cable coverings. The roof, ceiling, and electrical components are applied to the roof structure.

The lower shell and roof section reach the assembly line as separate preassembled units. The aluminum components of the lower shell and the roof section are protected from corrosion right from the start because of the quality of the aluminum (Al-6000). The floor section is sprayed with polyester plastic as protection against erosion. Preassembled chassis components--wheel systems, wheels, suspension systems, and driveline--are added to the lower sheel in the tilted position.

At this stage, the car can be started and all electrical components tested before the car is driven away for wheel alignment. All test results are recorded by a computer.

The floor and roof sections are then joined in an automatic jig. Before the outside panels are installed, all electrical contacts are tested. The outside

panels, windshield, side windows, doors, and rear hatch are installed as the last step on a separate line.

As an alternative to painting, the project group's partners are working on a special method for covering the entire body with a film. The beneficial environmental consequences of such a procedure are considerable, although it is difficult at present to say precisely what they are.

"As was said, no Volvo LCP will be put on the market, but the positive experience that has been gained will gradually be introduced in production. We are now better equipped to meet the demands that the future will place on automobile manufacturers," said Dan Werbin at the presentation. He will continue as head of production planning for the Volvo Passenger Car Division until the end of this year, when he will become the firm's assistant managing director.

The Volvo 2000 LCP has a low front and resembles a station wagon.

11798
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AUTOMOBILE INDUSTRY

VW GOLF II DESIGNED FOR AUTOMATED ASSEMBLY BY FEWER WORKERS

Bonn RHEINISCHER MERKUR in German 14 Oct 83 p 16

/Excerpts/ The Volkswagen Company can claim that the main plant in Wolfsburg is the largest single automobile production facility in the world. And it is no accident that with more than 20 million copies of the beetle produced, this is by far the greatest number of cars for one single model production in automotive history. The successor of the beetle, the first Golf, had in the meantime also reached a production of over 6 million copies. But its time also had come. It had reached old age. Almost exactly 9 years after introduction of the first Golf, in the midst of the 1974 automobile crisis, the first successor model copy left the final assembly line in Wolfsburg.

This assembly line has a special significance: the assembly of an automobile was achieved here--and this also is a world premiere--by robots for the first time on a large scale. Outward similarity of Golf I and Golf II can easily obscure the fact that the successor is a completely new car from the front to rear bumper, except for the choice of three engines and a selection of six transmissions. Financal support of about DM 2.1 billion was required, including about DM 400 million for development alone. The lion's share of over DM 1.6 billion was invested in new buildings, machines, and facilities. More than DM .5 billion went into the brand new hall 54.

A technically unsophisticated person naturally will ask the question why such an effort was mounted for a car which outwardly could be the younger brother of the first Golf. But new construction was needed not only because of the more attractive exterior, or the required greater interior space, better road performance and lower gasoline consumption. It was primarily needed to make the car "robot compatible." Ever since work had started in earnest on the successor car, it had become clear that the "new one" would largely be produced by robots, not only in parts production, mechanical production, stamping of body parts, and part assembly but also in assembly of major components and in final assembly. These robots, which, as machines go, can (almost) do anything, can perform many "manual tasks" even better and more exactly, as if they were being controlled by a magic hand, than the workers on the assembly line.

All this required early construction and work flow decisions which would permit use of robots--which to a great extent were produced by VW inhouse. The old Golf could, for instance, never have been assembled by robots. The designers

took this into account and miraculously produced a car on the drawing board which could, except for a few jobs, largely be produced and assembled by robots.

Today concrete results can be seen in hall 54, and in the adjoining hall 12 hwere, at the so-called control point 8, the new Golf cars leave the production line and are handed over to the distribution department. Hall 54 covering 120,000 square meters of useful area on two floors contains all assembly work and about half of the final assembly. On the main floor units and parts are assembled into groups, all completely automatically. On the upper floor the automatic body assembly is located; its magnitude realizes a worldwide first in automobile production.

But all of this also has its disadvantages. Production of the Golf requires about a thousand fewer workers than would have been required had the car been assembled with older methods. No workers had to be discharged because of favorable economic conditions, they were used in other parts of the organization; this also is due to the fact that startup and buildup of production of the new Golf had been planned for a considerable time.

In view of the painful experience, that this time the labor market could not be relieved by the hiring of new workers, as it had been the case on previous occasions during the introduction of successful new models, the VW company offers two arguments which could serve here as somewhat of an alibi: first, the elimination of overload of intellectual power and of monotonous work on the production line, and second the fact that without massive robot application competition with the Japanese, who are using similar methods but have much lower wages, would be even more difficult and would endanger workplaces.

It cannot be denied that robots can contribute to the humanization of work. It is not by chance that the name for the programmed grippers is derived from the Slavic "robot" which means something like "slavery" or "enforced labor." Unfortunately robots eliminate, together with slavery, also some of the normal acceptable work. To totally abandon robots, would probably, at least in the long run, have an even greater effect on the loss of workplaces.

These developments are symptomatic of similar conditions in other branches with increasing application of methods of rationalization. Only a few years ago companies used to hire new personnel in times of strong growth. Today companies act very carefully in this respect.

7994
CSO: 3698/79

FRENCH RESEARCH INSTITUTIONS FORCE CLOSER LINKS

Paris CHIMIE MAGAZINE in French Oct 83 p 11

[Article: "The CNRS [National Center For Scientific Research] and the INRA [National Institute for Agricultural Research] will cooperate"]

> [Text] The CNRS and the INRA have signed a cooperation agreement that provides for more closely linked research efforts.
>
> Three and a half million jobs, the feeding of the nation and rural area management depend on the activity of the agricultural and food sector. The association between these two organizations, aimed at better satisfying the future needs of that socioeconomic area, will allow to bring into agronomic research the scientific knowledge acquired by the CNRS in fields of biology, chemistry, engineering sciences and social sciences.

On the other hand, the INRA's thematic scope will help finalize some of these departments' projects.

The INRA AND THE CNRS have been cooperating with each other for a long time. They share several laboratories (pheromones at Saint-Remy-les-Chevreuse, nitrogen fixation at Toulouse) and programs (such as the "Moulon Farm" GIS [expansion unknown] for cereal improvement); researchers from the INRA and the CNRS are working side by side in university laboratories, etc... However, these two organizations wish to extend the scope of their activities along some broad lines that they defined together: microbiology, molecular plant biology, plant physiology, organic soil chemistry, agrochemistry, process engineering for food and agriculture, forestry, studies of rural France (history, economy, ect...).

These projects will be implemented along the prescribed lines of the newly-signed agreement and will take several objectives into account, in particular:

--a better distribution of both organizations' manpower in the various regions, particularly in areas' where they are still poorly represented;

--implementation of the results of on-going research;

--training and exchange of research personnel.

A coordinating committee and groups working on scientific problems of common interest will insure the continuation of the cooperation between the two organizations and will make it possible to consider new points of view.

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CSO: 3698/72

POLL ILLUSTRATES FOCUS OF FRENCH RESEARCH

Paris AFP SCIENCES in French 13 Oct 83 p 57

[Article: "Thirty-one French Companies Are Doing Biotechnological Research"]

[Text] On the first anniversary of the start of a program that is mobilizing all biotechnological resources, the Ministry of Research and Industry took a census of French companies that are concerned with biotechnology and are doing research in every direction in this field.

A tabulation of these companies has been published in the "101 Letter," the ministry's newsletter. That table, reprinted below by AFP SCIENCES, shows the existence of overlapping interests among these companies. It is the field of fermentation and cell cultures for the production of food and agricultural products that comes first in attracting the manufacturers' interest, just ahead of medical drug production.

Industrial Participants In Biotechnological Activities

Subject	Drugs (including antibiotics, immunology derivatives, hormones)	Reagents (including monoclone antibodies & enzyme reagents)	Food & Agricultural Products (including seeds, foods & animal feeds, biopesticides)	Raw Materials Chemistry, Energy-producing Compounds	Biodegradation & Anti-pollutants
Genetic Engineering, Microbiology	G3 Transgene Genetica Roussel-Uclaf Sanofi	Intergene	Transgene Roussel-Uclaf Sanofi BSN		
Cell Fusion	Rhone-Poulenc	Immunotech Hybridolab	Clause SNEA		
Enzymes, Enzyme engineering	Rhone-Poulenc		Roquette		
Fermentation Cell cultures	Roussel-Uclaf Rhone-Poulenc Sanofi Merieux Inst. Synthelabo	Merieux Inst.	Lafarge-Copee Bel. Bongrain Sodima Rhone-Poulenc Protex Pernod-Ricard Air Liquide	EMC Rhone-Poulenc	
Instrumentation, development of extraction & purification processes	Rhone-Poulenc Biolafitte	Biosys	Biolafitte Nordon Setric Technip (IFP) Speichim BSN		Degremont (Lyons Waters) General Water Company
Strain collections Data banks	Pasteur Institute		Museum		

SWEDEN'S FERMENTA SEEKS WORLD MARKET

Stockholm SVENSKA DAGNBLADET in Swedish 25 Oct 83 p IV

[Article by Elisabeth Sandlund: "Biotechnology Increases Fermenta Turnover Fivefold"]

[Text] Purchases of companies in the United States and France and new products developed with the aid of biotechnology are to increase the turnover of penicillin manufacturer Fermenta fivefold to 600 million kronor.

"We will use our knowledge in the fermentation field in order to develop more legs to stand on. Fermenta is to become a stable biotechnical company," says biochemist Refaat El-Sayed, who is the owner and managing director of Fermenta.

He bought the company 2 years ago from Astra, which had decided to close down its production of raw penicillin base, after its largest customer, U. S. Lilly, cancelled its contract. But Fermenta has grown since then and now has about 170 employees at the plants in Strangnas.

This year Fermenta will produce about 500 tons of penicillin, 90 percent of which is exported. The turnover is 120 million kronor, and net earnings 9 million kronor. As early as next year Fermenta expects to increase the turnover to 400 million kronor and profits to 37 kronor. The reason for that is the acquisition of two companies abroad.

Raw Material to Sweden

Fermenta has bought a penicillin plant in Pennsylvania, the capacity of which is equivalent to that of the Strangnas plant. Raw material from the U. S. plant will be brought to Sweden for final processing in Strangnas.

In France Fermenta will take over a plant outside Paris during the first 6 months of 1084. It is to be used for the synthetic processes which will give Fermenta new products.

An important new area will be vitamins, to be used as additives in fodder. The market is regarded as very expansive, in particular in the Far East, where Fermenta will begin cooperation with fodder companies. Another development

line concerns products for veterinary medicine. Fermenta intends to develop drugs against, among other things, chronic pneumonia and diarrhea in cows and pigs.

Veterinary Products

"In 1986 penicillin will represent 40 percent of the turnover, fodder drugs the same amount and the veterinary products 20 percent," Refaat El-Sayed says.

The rapid expansion of Fermenta will have the result that the ownership groups will expand. As of 1 January Electrolux will take over 30 percent of the shares. The background is an old cooperation between the group and El-Saayed in the field of water purification. The president of the Electrolux group, Gost Bystedt, is chairman of the board at Fermenta. In the long run an introduction of Fermenta on the stock market is not inconceivable.

"This is one of the alternatives we are seriously contemplating," Refaat El-Sayed says.

11949
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STATUS REPORT ON SWEDEN'S SKANDIGEN, BIOCARB

Stockholm SVENSKA DAGBLADET in Swedish 18 Oct 83 p 44

[Article by Karin Henriksson: "Sweden Prominent in Biotechnology"]

[Text] Surplus grain will become fuel.

This simple idea will soon become reality. In Lidkoping a facility for converting grain to ethanol, used as fuel, stands nearly completed. "This will be the largest biochemical effort in the country," the originators say.

The process is called Biostil, and Agroenergi Inc. (40 percent Lantmannen, 30 Alfa-Laval, 15 Kungsornen and 15 Vastsvenska Lantman) is the name of the newly formed company in Lidkoping. The customer is primarily OK [Oljekonsumenterna Inc.], but the next step for Agroenergi will be to manufacture starch.

"We have a relatively large agricultural surplus in this country, and this is one way of being able to keep the present acreage. At the same time there is a growing market for starch, and if we do not manufacture it, imports will grow," the head of Agroenergi, Goran Wadmark, says.

The Biostil facility is in fact proof that Sweden is already prominent in biotechnology. This applies perhaps not as much to the more imaginative perspectives in this field, as to equipment for biotechnical research and production.

Separation/purification represents 70 percent of the cost of a biotechnical product, Pharmacia writes in its annual report. Pharmacia calls itself the world's leading subcontractor for "biotechnical technology." The old separator specialist, Alfa-Laval, is another such example, as is LKB-Products, which, moreover, has seen its price climb from 300 kronor to 470 kronor since its introduction on the stock market last summer.

Carl-Gustaf Rosen, research chief of the Alfa-Laval industrial group, says:

"When the processes are scaled up from working with milligrams to industrial production, other techniques are needed in part, at the same time as the economy becomes a different one. Here we are sitting on some techniques, and

in addition we have expanded the laboratory resources. We view this as a new frontier--a giant field, which can keep us occupied for many years."

Lennart Arlinger, division head at LKB Products, says:

"Undoubtedly one is now in a new phase, where it is less a matter of research glamour and rapid growth for the young companies. Instead, it is a matter of hard work in order to transfer the whole thing to production. We are aiming for considerable market shares in percent for the new segments in separation technique. Up to now there has been great interest in for example our DNA sequencer, which is a key instrument in genetic biology, and there we aim to have a leading market position."

Thus far sturdy vessels, fermentation basins and measuring apparatus. How does Sweden rank when it comes to research and manufacture of the genetic engineering products of the future?

The prime example is Kabigen, the company which according to its managing director was first in the world to write a hybrid DNA contract. KabiVitrum's growth hormone which prevents stunted growth is already being manufactured at the Strangnas plant. Clinical tests are under way both in Sweden and other countries, and it is hoped that the hormone which is produced with the aid of bacteria will be approved by the Social Administration in 1985.

"It has gone surprisingly fast. Normally, one expects it to take 10 years for a drug to enter the marketplace," says Bjorn Holmstrom, head of the microbiological laboratory at KabiVitrum, which has certain projects laid out at KabiGen.

KabiVitrum has blood research, among other things, on the program. U. S. Biogen and KabiVitrum cooperate on the so-called factor 8--the factor which is missing in the blood of hemophiliacs.

"We will produce the factor in pure form, then they will use it to pick out the gene and place it in a bacterium, and then we get it in order to begin to cultivate it ...," Bjorn Holmstrom says.

Thirty-Five Millions

The Administration for Technical Development (STU) budgets about 35 million kronor annually for biotechnical research. Together with Pharmacia, STU is investing for example 18 million kronor for research in cell biology and gene technology over a 6-year period at the Wallenberg laboratory in Uppsala. In many places there is ambition for increased cooperation between universities and industry--the above is one example, and the KabiGen interferon project in cooperation with Umea University is another.

Briefly, biotechnical research at the universities looks like this: Uppsala: Advanced separation technique and research with applications within human medicine, agriculture and veterinary medicine; Stockholm: At the universities and at Karolinska Institute (KI) immunological and

immunotechnical research, as well as studies around large-scale extraction of biological substances, is being conducted, at KI there is also gene-technological research and at the Institute of Technology there is apparatus technology, fermentation technology, enzyme technology and microbiological synthesis; Lund: at KemiCentrum the emphasis is on technical applications of biochemistry and microbiology; Goteborg: anaerobic bacteria and marine microbiology; Umea: at the Unit for Applied Cell and Molecular Biology the human gene for the plasminogene activator (a blood protein) has been cloned, for example.

Advanced Research

Other research centers are the National Bacteriological Laboratory (biotechnical production of vaccines and detection of infections) and the National Agricultural University (biological nitrogen fixation, biological disease control and forest genetics).

Gustaf Brunius, who is secretary of the delegation for hybrid DNA questions, says the following:

"Hybridomatechnology is growing increasingly strong, and we in Sweden are far ahead in that area. People are very reticent, and I regard that as very interesting. At Karolinska Institute advanced research is being conducted on human antibodies. This is not only for diagnostic purposes but also for treatment--in the long range it probably involves future drugs against certain infectious diseases, cancerous diseases."

The companies in the forefront are KabiGen, KabiVitrum, the Diagnostics division of Pharmacia, further Cardo, which--together with Sockerbolaget--owns KabiGen, new AC Biotechnics (together with Alfa-Laval) and the plant breeding company Hilleshog. Perstorp has also begun to look at biotechnology through, among other things, certain investments in a few U. S. gene companies. Carbohydrates and prostaglandins have high priority, says director Sten Nordberg, "but we are proceeding cautiously so far."

Expensive Technology

Furthermore, KabiVitrum has come out with an offer to the most well-known major companies of a special issue of new shares aimed at increasing the capital stock of KabiGen and simultaneously measuring the interest in biotechnology among other companies.

Bjorn Holmstrom, KabiVitrum, says:

"Gene technology is still a very expensive technique to develop. Today it is a matter of producing small quantities of very active substances with a high price per kilogram or gram, and it is only the pharmaceutical companies which can afford it."

For several years there was fierce debate about hybrid DNA in Sweden, and industry spokesmen--as for example Bertil Aberg at KabiGen-- are of the opinion that this led to unnecessary delays.

"One could still grumble a bit about the Occupational Safety Board and the cumbersome systems of regulation," Bjorn Holmstrom says and states that at KabiVitrum one has permission to work on a scale of 10 liters, but that it would be desirable to get permission to work on a medium or large scale of 100 liters.

In conclusion, Sweden's position in this field may be said to be very strong as regards equipment and process knowledge for biotechnology--which, by the way, is the only commercially successful sector internationally as well.

Other than that, the outlook seems very hopeful for some areas of the future, such as human antibodies.

11949
CSO: 3698/103

BRIEFS

BIOCARB FORMED IN SWEDEN--A new biochemical company, Biocarb Inc., has been formed in Lund. Starting with fall 1983 it will carry out development work in the field of biologically active carbohydrates on behalf of itself and of customers. The company is a so-called intermediary firm, which links research to the needs of industry and society. Behind Biocarb are a number of researchers. The financial backers and minority shareholders are financiers Erik Penser and Anders Wall. (TT) [Text] [Stockholm SVENSKA DAGBLADET in Swedish 19 Oct 83 p 29] 11949

CSO: 3698/103

FRG, SWISS FIRMS SHOW PLASTICS-PROCESSING FLEXIBLE WORKSHOPS

Paris L'USINE NOUVELLE in French 27 Oct 83 pp 117-119

[Article by special correspondent Pierre Laperrousaz: "Plastics Processing: First Two Flexible Workshops"]

[Text] Automation of the plastics injection-molding workshop--begun several years ago with microprocessor control, loading-unloading manipulators, automatic mold changers, centralized control of machine pools, etc--has led today to the flexible [plastics-processing] workshop, two examples of which were shown at Kunststoffe 83.

The pieces of the puzzle already existed: It was "only" a matter of assembling them. From this standpoint, therefore, the Kunststoffe 83 event--the showing by Netstal and Battenfeld of their respective plastics-molding flexible workshops--was really not a surprise. What was more surprising was that these workshops are not mere stylistic exercises designed to demonstrate the feasibility of a concept. One of them at least, that of the Swiss builder, has already found a buyer: A big subcontractor--in all probability, a German one.

Conceptually, on the whole, both shops incorporate the same basic principles: Centralized control, by computer, of the operations involved in manufacturing changes and the collection of production data; local controls of the machines and peripherals, receiving their instructions and governing parameters from the central computer; integrated automation of all functions (changing of mold and plasticizing unit with preheading and bleed-off; attachment of ejectors; connecting up of fluids, energy and metering sensors; adjustment of mold thickness; changes of material; extraction of the parts by manipulators and their evacuation by conveyor belt; etc).

Their actual designs, on the other hand, differ considerably from one another, that of the Netstal system being, it would seem, somewhat more advanced. In the Battenfeld system the molds are transported by an air-cushion conveyor and introduced laterally into the machines, whereas in the Netstal system they are transported by an overhead crane and are inserted from above. According to the Swiss builder, this arrangement results in a reduction of 30 percent in needed workshop area.

Substitution of One Mold for Another in Minutes

Another feature enables faster changing of molds. To this effect, the overhead crane is equipped with two twin hoists: When the computer determines that a fabrication has been completed and starts up another, it commands the traveling crane to transport the new mold from the preheating station to the machine by means of the first hoist. The second hoist then extracts the mold in place, freeing the machine to receive immediately the new mold being brought to it by the first hoist. Thus, a change of molds requires only one go and return of the crane, between the machine and the preheating station, and between the latter and the tool storage bin. In the Battenfeld system, on the other hand, the conveyor transports only one mold, and two round trips are therefore required (technically speaking, however, there is nothing to prevent adapting the conveyors to transport two molds).

In the Netstal system, the change of plasticizing unit follows the same procedure as the mold change. This is another way in which it differs from the design of the German builder's system: In the latter, certain machines are equipped with two screws, the change from one to the other being accomplished by a simple translation. The design is much simpler but offers less flexibility. In both cases, the plasticizing units are preheated automatically, and provision is made for running through several "heat-up" injections before actually commencing the new fabrication (even though only a mere color change may be involved). The connecting up to the new-material feed is, of course, automatic.

According to both builders, their entire line of machines can easily be modified to become part of a flexible workshop, as is also the case with most of their molds, which will be mounted on standardized baseplates and fitted with standardized ejectors as well. The machine control bays must also be equipped with an interface for connection to the central computer. But there can be no doubt that the integrated systems, which can more easily standardize their toolings, and the new shops, which will have freer scope in determining their machines, will be in a better position to take advantage of the opportunities offered them by a flexible workshop.

Manipulators Doing More and More

This does not mean, however, that the others are being denied the possibility of embarking, in varying degrees, on the automation of their production. Without taking it to the point of a flexible workshop, they can nevertheless achieve a certain flexibility with mold changers such as those being offered by Engel or by Arburg (Rapidomat). These two systems provide alternate operation of two different molds, set up on a table alongside the machine and inserted laterally. In the Engel system, however, the connections are interrupted at each change, whereas in the Arburg system the two molds remain connected at all times to the fluid distribution system by means of flexible hose pipes.

Kunststoffe 83 also confirmed the breakthrough in unloading-type manipulators. To better justify their viability, their builders are trying to maximize the number of additional tasks they can perform: Palletization, marking, de-coring, assembling. An interesting example could be seen at the Krauss-Maffei stand: Extraction, by a Remak robot, of the two half hose-walls from a garden-hose rolling mill, both of which had been injected simultaneously into a two-track mold, and their assemblage by brooching, accomplished by a simple closing over itself of the extraction tool; the robot then proceeds to stack parts in a carton, intercalating inserts between the parts. The same idea has been applied by Albora (a French builder of manipulators, exhibiting at the Engel stand) with respect to the fabrication of pronged lens-holders (by Allibert). The Albora robot--which has been marketed since the beginning of the year and is the result of a joint effort among Allibert, Ateliers Bouvier and Merlin Gerin--is characterized by three programmable axes and one automatic tool-position correcting axis. It is particularly well suited to palletization, and its programming is done in clear language by interrogation and response.

Loading-unloading automation is applied also to more-highly-specialized machines. For example, to the casting from existing molds of preforms for electrical plugs at Aviaplastique. The tooling consists of four molds placed on a turntable. The broaches are prepositioned, by means of a vibrating-bowl distributor on a transfer plate, from which a manipulator arm takes them and positions them in the open mold. After rotation of the turntable and replicate casting at another station, the preforms are extracted by a second manipulator arm. The time of the cycle is 12 seconds and the production rate is 1,200 pieces an hour. Rico-Rego, a German builder, has automated the operation that follows: Molding of the electrical plugs from the preforms. A 6-axis robot positions the preforms (in batches of fours), with their appliance cords attached, in the molds, and extracts them after replicate molding.

From the standpoint of control systems, the use of a microprocessor is now no longer a novelty. However, several new systems were shown by Krauss-Maffei (MC2), Klockner Ferromatik (FM), Sperry Wickers (System 330), Boy (Mipronic), Battenfeld (Unilog), Krupp Kautex (MCC for blower machines), Barber Coleman (Maco 8000)...

For the most part, these systems are equipped with interfaces for connection to a central computer. Certain builders are offering self-adaptive controls that correct for themselves the parametric values in accordance with pvt [expansion unknown] curves for the material, in the event of changes in temperature of the material, of the oil, etc. This was already being done in the case of dk-Codim [expansion unknown] (Module 6).

Battenfeld is now offering this option on its CNC 80/85, and Krauss-Maffei on its MC2. In the latter case, the self-adaptive module and its programs, built around a 32-bit microprocessor, is provided by the French builder CPI.

This offering is additional to the four 16-bit microprocessors of the "standard" control that provide closed-loop regulation of rate of injection, hold pressure, back-pressure and rotation of the screw. Cathode-ray display is being featured more and more frequently, facilitating adaptation to foreign markets. Thus, OIMA [expansion unknown] (Italy) showed an "Arabic-speaking" system. The color display is almost always an option, but it is considerably more expensive (10,000 francs more for the Krauss-Maffei system, for example).

The user whose personnel or pocketbook are opposed to a screen or to highly sophisticated control systems can still come up winners. Thus, Krauss-Maffei is offering, in a standard version, all the services of its new MC2 control without screen and for 26,000 francs less (as compared with black and white).

The operator is in all cases provided with a keyboard for the selection of functions and inputting of data. But the display is on an instrument panel on which signal lamps indicate the selected function (several tens grouped on two pages: closure and injection) written in clear language, and the basic parameter concerned, the value of which is signaled by electroluminescent diodes.

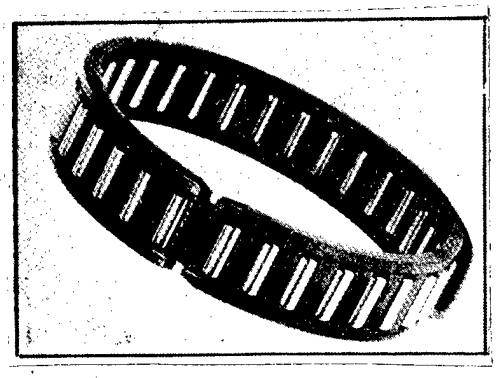
Battenfeld, for its part, is offering three new controls with features according to a graduated scale, providing adaptability to the needs of different users. Unilog 100 (in standard version) permits keyboard preselection of injection pressures. Unilog 2000 offers, in addition, control of runs, display by means of a 4-line liquid crystal screen, and storing of data in a magnetic memory. And Unilog 3000 features closed-loop control of injection rate, hold pressure and back-pressure.

[Boxed section, p 119 follows]:

Materials Shown at Kunststoffe 83

Fundamental discoveries over the short term are not the rule in the domain of plastic materials. Nevertheless, Kunststoffe 83 provides several glimpses of trail blazing:

--The commercialization of self-reinforcing polymers will not be long in coming. Within 1 year? Two years? The producers, like ICI [expansion unknown] and Bayer, still refuse to commit themselves as to a date; but it is a known fact that testing is under way in laboratories and even in the industrial sphere. The self-reinforcing properties of these polymers are owing to the presence of rigid polymeric segments in the material that form, already in the molten state, configurations similar to those in crystals, which retain their high degree of orientation even after solidification. Bayer has disclosed moduli of elasticity exceeding 8,000 MPa, equivalent to that of a 30-percent-glass-fiber reinforced technopolymer composite. According to ICI, these materials are characterized also by a slight skew, very good dimensional tolerances and good moldability.



One application of BASF's Ultrason polysulfone in the field of mechanics, owing to its resistance to age-hardening at high operating temperatures (roller-bearing cage).

--Rhone-Poulenc is introducing a new family of amide-class thermoplastic polymers whose rebound hardness (between 75 and 55--and soon to come, 40--on the Shore D) is adjustable by way of the nature and content of the components of the molecule. From the standpoint of performance characteristics, the Dynils are in a category between the rigid thermoplastics and the rubbers. Their density is close to 1 and their moisture-vapor transmission is low. Their initial applications are related to ski boots (Salomon; their stiffness varies very little at low temperatures), where they are replacing the polyurethanes, tubing in automotive vehicles, lockwashers, etc).

--Bayer is introducing carbonate polyesters (PEC)--co-condensates of aromatic polyesters and polycarbonate--which are already available in three types. The most marked property of these thermoplastics is their high resistance to deformation by heat (Vicat point 180°C).

--Bayer also is introducing a thermoplastic polyphosphonate (POP) chemically similar to the polycarbonates. Available at laboratory levels, its principal property is that it is virtually not flammable in a normal atmosphere of 21 percent oxygen. It requires at least a 70-percent concentration of oxygen to burn.

--BASF is introducing Ultrason S, a polysulfone resin, which will now take its place alongside Ultrason E, a polyether sulfone introduced about the beginning of 1982. Its breakdown temperature is slightly lower in continuous service: 150°C for the standard variety, and 170°C for the variety reinforced with a 30-percent content of glass fibers.

--Solvay has announced the introduction, by early 1984, of Nyref, an aromatic polyamide combining a high resistance to mechanical constraints, to plastic flow and to fatigue, with very good dielectric properties. The product line will include a carbon-fiber-reinforced variety and another variety for low-structural-weight applications.

--And lastly, the users of PPS [phenylene polysulfide] will be glad to learn that there is now a second producer of this material who has succeeded in establishing a presence in the market for its numerous applications--in electronics, in mechanics, in chemistry, etc. Here again, it is Bayer.

9238
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SWEDEN DEVELOPS NEW COMPOSITE STEEL MADE BY POWDER METALLURGY

Stockholm NY TEKNIK in Swedish 14 Jul 83 pp 10-11

[Article by Lars Pekka]

[Text] A team of researchers at the Lulea Technical College has developed an entirely new steel: composite steel produced by powder metallurgy.

The steel has almost the same properties as a studded winter tire.

The development work was carried out at the request of an American firm in the offshore oil industry which wanted a gripping device made of ductile base material but with jaws of hard material.

The new steel may mean revolutionary changes in the manufacture of various cutting tools such as axes, knives, sawteeth, and planing tools.

It works on the same principle as a studded winter tire, which has a tough ductile material (rubber) as its body and a hard material (the studs) to grab the slippery surface.

This steel can now be produced using powder metallurgy at the Lulea Technical College's Department of Machining Practice. It is therefore a composite material.

Suitable for Gripping Devices

Quite simply, the process uses various types of steel powder that are joined together to form an integrated unit.

A group of researchers headed by engineer Bjorn Aren is now in the process of supplying gripping devices made of this composite steel material to an American firm in the offshore oil industry. The gripping devices are used as jaws in large wrenches that grasp pipes and drilling rods when the latter are being joined or handled in various ways.

The jaws are made of hard nickel-molybdenum steel that "floats" on soft unalloyed steel.

This means that the gripping device can be formed to fit the pipe or drilling steel without cracking. At the same time, the hard jaws can bite into the pipe and get a good grip that does not slip.

Bjorn Aren says: "The total demand for such gripping devices comes to about 15 million units per year. Our customer in the United States accounts for 15 percent of the market."

Jobs in Northern Sweden

"Producing that quantity of gripping devices--2 million units--would certainly be able to keep a production line in Norrbotten busy," says Bjorn Aren, who would like to see northern Sweden benefit from the research team's development work.

The new composite steel material may also be of great importance in, among other things, the manufacture of woodworking tools such as knives, axes, sawteeth, and planing tools.

The methods that have been used until now to produce cutting tools of composite steel include forge welding and electron beam welding.

Today's Steel a Compromise

Most of today's cutting tools are not composite, however. The steel that is used often represents a compromise between the need for a hard cutting edge and the need for a tough base material. The cutting edge is then hardened by local heat treating. But the result is not at all of the same high quality as that provided by composite steel.

"Forge-welded and electron-beam welded tools do not permit the production of parts with complicated geometry," says Bjorn Aren, who has been involved in developing the new technology for 3 years.

As was said above, the request to develop the new composite material came from the United States.

Bjorn Aren says: "We accepted the job on condition that any resulting production would take place in northern Sweden."

Time for Production

The development work was relatively expensive. Among other things, a 450-ton press had to be installed, complicated press and forging tools were manufactured at the college's own workshop, and it was necessary to alter a large conveyor furnace and procure a tube furnace.

The Norrbotten County Employment Board helped pay the labor costs.

The technology is now so well developed that it is time to begin translating it into practical production.

"Installing a production line would cost from 8 to 10 million kronor, and it would take another million or so to convert our technology into a full-scale plant."

Aren says: "We have only gotten as far as we have thanks to subsidies from the Norrland Fund and the Norrbotten County Development Fund."

Good but Expensive

Some of the new technology's advantages are as follows:

1. Complicated parts can be produced.

2. No further machining operations are required.

3. No material is wasted.

4. There is no additional joining operation.

5. Heat treating is simple.

The disadvantages are that the technology is still uncommon, and steel alloys with nickel-molybdenum are expensive. But since the process technology is superior, the cost of materials does not worry Bjorn Aren.

"The foremost competitive weapon is a finished product's technical qualities, not its price."

How New Process Works

The manufacturing process can be summed up as follows:

Powder pressing: Powder with differing properties is pressed together to form a so-called green stock (the blank) that has a solidity of about 80 percent.

Heating: The green stock is heated to just over 1,100°C in a furnace with a controlled reducing atmosphere that prevents oxidation of the powder.

Forging: The hot green stock passes from the furnace into the forging tool. The forging, which takes place in a controlled atmosphere, gives the blank body its final shape, in which it is about 100-percent solid. Forging in a controlled atmosphere also results in very good surface properties.

Heat treating: Since it is completely solid, the forged part can be heat treated in the conventional manner. Heat treating can take place in connection with the forging or as a separate operation.

11798
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ERRATUM: This article is republished from JPRS 84722 of 10 November 1983 No 163 of this series to correct certain translation terms.

GERMAN FIRM'S WAY TO MAKE TITANIUM-BASED LARGE PARTS NOTED

Duesseldorf VDI NACHRICHTEN in German 3 Jun 83 p 20

[Article by Franz Gremm: "Powder Metallurgy in Place of Forging: Hot Isostatic Press Manufactures Complex Formed Parts"]

[Text] Trend-setting requirements for titanium-based powder-metallurgical parts are coming from aeronautics and astronautics. Here, the requirements are frequently so high and space and (especially) weight constraints so critical that only this material offers a sure and satisfactory solution. That, however, offers challenge enough for conventional manufacturing methods.

The development work for powder-metallurgical parts made from titanium alloys has reached a new level at the Krupp Research Institute in Essen. On a market-oriented technological scale, large and complex formed parts for machines, installations and equipment building can now be produced, in some cases as substitutes for parts which were forged in the past. The development of appropriate small steps to ensure the correct functioning of process operations had preceded this. Following this, a flexible encapsulation method based on ceramics was developed during a long series of tests. Finally, a large hot isostatic press was installed in Essen, an investment of over DM 3 million.

With the new hot isostatic press and the available encapsulation method, components having major dimensions on the order of 500 by 1,000 mm can now be manufactured.

At this stage of development, what concrete ideas have been formulated at Krupp concerning broad application of the process? In answering this, Dr-engineer J. Hartwig, business manager of the research institute, comments, "Ahead lies the objective of making alloyed parts which cannot be made by melt metallurgy. This means that completely new material classes will be opened up for practical utilization.

"Second, known forging and casting alloys can achieve extremely high homogeneity in parts made by powder metallurgy. A key word in this regard is segregation. Alloys which have a propensity to segregate can be formed into

homogenous parts using powder metallurgy. This leads to very uniform, isotropic properties and mechanical characteristics under both static and dynamic stress conditions.

"To put it simply, with powder metallurgy, the properties of forged parts will always be achieved. An advantage in this regard is the fact that parts manufactured by powder metallurgical methods do not exhibit differences in strength as a function of forming direction. This is not true for forged parts."

A part which can be easily made by forging cannot, according to J. Hartwig, be economically manufactured by powder metallurgy. "Our tasks are thus related to achieving the most cost-favorable production of complex components wherein the powder-metallurgical method saves raw material costs as well as time and cost in the manufacturing steps," he relates. "We achieve with the powder-metallurgical method near-finished parts, of course."

For a typical part which has been manufactured for a considerable time at Krupp, Dr-engineer Hartwig lists the following specifics: "The starting weight for a forged design using titanium alloys was 7.8 kg. The finished part weighed only 1.7 kg. About 80 percent of the material--with a current cost of about DM 100 per kg--falls victim to machining operations. When using conventional powder metallurgy, the same part weighed 3.2 kg, so that only 1.5 kg, in this case 47 percent of the raw weight, had to be removed by machining. But even this loss is presently being reduced further," observes Hartwig.

At Krupp an analysis of the powder properties resulting from various methods of production was conducted; following this the institute developed its own method. The resulting facility, which has been in operation at the institute for some time, produces about 30 kg of high-grade titanium powder per hour in continuous operation.

The second basic manufacturing step consists of making suitable capsules. Controlling the complex shrinking process of capsule and powder charge during hot isostatic pressing is a critical issue and is complicated by the wide variation in capsule shapes associated with a broad spectrum of parts.

There is an art to making capsules. For parts with complex shapes, ceramic capsules developed specifically for the purpose are used in most cases. For simple geometries appropriately welded plate capsules are used.

Can the laws for manufacturing capsules be determined, do theoretical principles offer a sufficient possibility for calculation, or can the suitable form be found only experimentally?

Concerning this point, Dr E. Hillnhagen, director of the Materials Research Section of the Krupp Research Institute, explains: "At first the idea grows intuitively--on the basis of broad expert knowledge, of course. As the development progresses, intuition is augmented step by step and replaced by systematically worked out and theoretically founded design parameters. This holds especially for critical geometric figures like corners, holes, edges and changes

in cross section. A generally applicable design method for arbitrary geometries remains a worthy but difficult-to-attain development objective."

The finished, vacuum tight capsules, filled under special precautionary measures, are placed in the hot isostatic press. The goal is a fully 100 percent densification. Required for this is a temperature of 930 degrees centigrade, a pressure of 1,500 bar and a pressing time of 1 to 3 hours. The cycle time, which includes heating up and cooling down, requires 6 to 7 hours. The number of parts which can be made at the same time depends on the volume of the part and the press cavity. The usable volume of the new Krapp installation is 600 mm in diameter and 1,500 mm high.

The required fundamentals are in hand for widespread introduction of the method. Also, the basis for developing the practice is not lacking. What is demanded is a focused marketing effort designed to convince potential customers of the feasibility of this manufacturing process. In each individual case, the specific constraints such as number of parts required, geometry and size are of critical importance.

At least conceptual support for the new methodology is expected from other results from the Materials Research Section of the Krupp Institute. Presently, alloys are being developed for orthopedic implants, particularly on the basis of "memory" materials. In the area of abradable parts, composite samples are being tested which have the cutting capability of hard metals on the one hand and the weldability of steel on the other.

The Krupp Research Institute works primarily on in-house tasks. But to a certain extent it also does research and development work under contract to government agencies and other industrial firms. Also, the new hot isostatic press will be used to do redensification work for other firms under contract.

Photograph Caption:

The new hot isostatic press in the Krupp Research Institute in Essen has usable cavity dimensions of 600 mm diameter and 1,500 mm height. Not just the institute's own titanium-powder parts will be compressed at 930 degrees centigrade and 1,500 bar, but the facility will also redensity other alloys under contract for other establishments.

9130
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SGS BEGINS AMBITIOUS GROWTH PLANS WITH $40 MILLION PLANT

Paris ELECTRONIQUE ACTUALITIES in French 14 Oct 83 pp 1, 15

[Article by JP Della Mussia: "Following an Investment of $40 Million Francs, SGS (Semiconductor Group) Wants To Become the World Leader in Power Semiconductors"]

[Text] Catania, Sicily--SGS is very ambitious but it knows how to provide itself with the means to reach its goals: after having decided in 1980 to bet wholeheartedly on medium-power semiconductors, and following a fire which ravaged the Catania plant in 1981, SGS invested $40 million in this plant, with the main part of the investment being devoted to medium-power semiconductors.

Concrete results are today apparent both in the plant's equipment and in the increase of its turnover, and, for the past 3 months, in the elimination of its losses for the first time. According to Dataquest, SGS supplied 3.5 percent of the power [semiconductors] on the world market in 1982, with 4.3 percent expected for 1983. SGS does not hesitate to project 5.6 percent for 1984 and 7.2 percent for 1985, its goal being to become eventually the world leader in this area. Out of a turnover of 227 billion lire in 1983 (+32 percent expected for 1983 with an inflation rate of approximately 15 percent), SGS's activity in discretes accounts for 28 percent or 63.6 billion lire or Fr320 million. Of this figure, 60 percent is due to power transistors, 34 percent to small signal transistors, and finally 6 percent to activity in TTL-LS's [transistor-transistor logic--logic switches] and metallic grid C-MOS's [complementary metal oxide semiconductors], which is the responsibility of SGS's Catania plant (discrete and standard logic department).

An Automated TO3 Assembly Line

Why have a plant in Sicily, an area which does not have the reputation of combining all the ideal social conditions for achieving worldwide success? In fact we are dealing with a challenge by the president of SGS, Pasquale Pistorio, and the plant manager, Salvatore Castorina, two old Sicilian friends, both "alumni" of Motorola, who now apply their knowledge in their native country. They have in fact managed to instill motivation at the Catania plant (at least among the supervisory personnel), which is leading to undeniable success.

The department's present strategy can be summarized in a few themes: increased production efficiency of high-technology products; increased productivity, output and quality; reduction in cycle time (presently 23 to 24 days including diffusion); increased gap between the sales price and the purchase price; selective invasion of competitors' markets; strong increase in market share outside Europe; and finally customer service.

At the investment level, the most spectacular aspects of the plant at this time are a 5-inch unit which serves as a pilot line for new products, the fast epitaxial units which are one of SGS's strong points, and a TO3 can assembly line all of whose stages are automated, from placing the chip in position on the soles of the cans to automatic laser scribing following sorting, by way of bonding, of course. To our knowledge Catania is the only plant in Europe, if not in the West, to have an automatic TO3 assembly line. When it operates at full capacity it will by itself produce 15 million TO3's per year.

83 Percent for Export

The discrete division, which employs 1,650 persons and whose turnover should increase by 20 percent this year, now owes 83 percent of its turnover to export. The division says that it supplies 9 percent of the European switching power transistor market and 1.7 percent of the American market. Moreover, it invests 7 percent of its sales in research and development. Diffusion is done at Catania and Rennes, assembly and testing in Malta, Muar [Malaysia], and Singapore, and pointing at Catania and Rennes.

According to the SIA [expansion unknown], in 1981 SGS supplied 4.5 percent of the power transistors on the world market excluding Japan (including the RF's [radio frequency transistors]). This proportion rose to 5.3 percent at the end of 83 [as printed] and then to 6.1 percent in the second quarter of 1983. According to SGS, this proportion will surpass the 6.5 percent expected for the end of 1983 and it could reach 9 percent by the end of 1984.

Taking into account the Japanese, SGS expects to supply 5.6 percent of the world market in 1984 (10.5 percent of Europe; 5 percent in the United States; 3.4 percent elsewhere) and 7.2 percent of the world market in 1985 (12 percent of the European market; 7 percent in the United States; 3.4 percent elsewhere).

At present the distribution of the turnover for power discretes by areas is as follows: industry 30 percent, information science 20 percent, automotive 20 percent, general public 20 percent and telecom 20 percent [as printed].

To give you a few more figures and to show the rise in its competitiveness, SGS stresses that its costs for power discretes have dropped progressively, starting from a base of 100 in 1981, to 55 in 1983. They should drop to 50 in 1984 and then decrease progressively to 35 in 1987. For the quantities produced, the growth is spectacular: starting from a base of 100 in 1980, these quantities rose to 171 in 1982 and 244 in 1983. Figures of 400 are expected for 1984, 533 for 1985 and 600 for 1986.

At the quality level, there is the same spectacular evolution, the goal being to catch up with Japanese quality: the total rate of defects is supposed to be reduced from 2000 ppm [parts per million] in 198] to 900 ppm in 1983, 400 ppm in 1984, 200 ppm in 1985 and 100 ppm in 1986 (the rate of catastrophic defects reaching 15 ppm at that time).

Toward Integrally Controlled Darlingtons

SGS does not rely for success only on dynamic sales, investments assuring low production cost and large production capacities, and a quality-control program. The company banks on an original range of products, the most visible aspect of this originality being one of the biggest range of cans in the world, including the recent SOT82 and TO240 (the latter resulting from a recent agreement with Semikron).

It is noteworthy that SGS produces neither thyristors nor power diodes (for now), the company devoting all its resources to transistors and Darlingtons of all kinds. Since a short time ago, its range of Darlingtons, in particular, covers numerous varieties of configurations including Darlingtons and "Trilinton" (triple Darlingtons) with integrated Zener protection (for ignition and control of small motors). SGS is one of the very few companies in the world to use the performance capabilities of multiepitaxial technology to a maximum degree; this not only allows easy production of complementary NPN and PNP as well as transistors with an improved security space, but also permits fabrication in sections of more than 3 inches (which is an advantage only for the fabricator).

Currently SGS is increasing its range of power MOS's from 28 to 100 models by the end of 1983, is developing its family of SOT-83 miniature can products, is introducing new transistors for general use including its range of TO240 cans, is developing Darlingtons without a parasitic diode, and finally is developing new very fast high-voltage bipolars.

In the intermediate term, no study is planned on devices of the GTO, IGT or Comfet types. On the other hand, at Catania SGS is studying the possibility of integrating the control part of a power chip on this chip. (Let us recall that the Agrate [Italy] plant, on the contrary, is developing integrated circuits which depend on a power part on the chip to satisfy well-defined applications). Catania is not at present developing cans more complex than the TO240.

100 MOS's by the End of 1983

The goal of SGS in power MOS's is to take up a position in this market and to profit from its growth without wanting to particularly distinguish itself, except perhaps at the can level. The estimates of MOS market share in the area of intermediate power are more realistic at SGS than at its competitors': 4.8 percent in 1981, 6.1 percent in 1982, 7.5 percent in 1983. SGS technology too seems to be ahead of that of the latest products of its competitors (IR [expansion unknown], Motorola, Siemens). At present SGS calls on three chip sizes and on two chips, depending on the voltage (100 volts and

400 volts, and a 60-volt variant). During the initial period the company is producing secondary sources. In the intermediate term, it will introduce 200-volt models for telecom and 500-volt models for the majority of industrial applications. A family of chips with a surface area of 31 square millimeters is also planned. However, the manufacture of P-MOS's [positive MOS's] is not planned by SGS because these products would be five times as expensive as the N-MOS's [negative MOS's].

5586
CSO: 3698/78

FRANCE'S CGE-THOMSON ACCORD, CONSEQUENCES OUTLINED

Paris LE MONDE in French 22 Sep 83 p 41

[Article: "CGE-Thomson Agreement and its Consequences"]

[Text] The protocol of intention signed in late August between Georges Pebereau, managing director of CGE [General Electric Company], and Alain Gomez, chairman of Thomson-Brandt, is some 30 pages long with its appendices. This agreement calls for a rather complex series of measures. The past few days, some very minor changes were made in the protocol, e.g. CGE's 10 percent stake in Thomson-Telecom was raised to 12 percent. The agreement is likely to be slightly amended during coming negotiations with other companies, trade unions, and the government, negotiations designed to put the finishing touches to this industrial restructuring.

Financial Arrangements

Thomson will merge its following subsidiaries into a new company called Thomson-Telecommunications:

a. Thomson-CSF telephone and its principal subsidiaries: Ferrer-Auran, Vega, Cimest, TIT, [Industrial Engineering of Toulouse], Somartel, Sote, Saci, Thomsom-CSF Inc. U.S.A., and the company's facsimile transmission department;

b. Its space and microwave relay system divisions, its 50 percent interest in Telespace, LTT [Telephone and Telegraph Lines Company], and its telecommunications and computer-based business machine activities;

c. Thomson-CSF data processing--with the exception of Cimsa, CAMECA [Company for Applications of Mechanical Engineering to Electronics, Motion Pictures, and Nucleonics], and Saphymo--Answare, TITN, AEA, and Syseca.

In addition, Thomson has committed itself to raising Thomson-Telecom's net consolidated assets to 751 million francs as of 31 December 1983 by additional contributions of securities and real estate, write-offs, etc. These contributions include, inter alia, Thomson's interest in Fortune, an American firm, and 5 percent of TEAC, a Japanese company. In addition, Thomson and CIT-Alcatel will each contribute their respective 34 percent holdings in Locatel to Thomson-Telecommunications.

The state will then underwrite increased capital for Thomson-Telecommunications amounting to approximately 720 million francs and Thomson will reassign 12 percent of its capital in the company to CGE. Upon completion of these operations, the state will have a 48 percent ownership stake in Thomson-Telecommunications, Thomson a 40 percent stake, and CGE a 12 percent stake.

CGE, for its part, will form a holding company to which it will contribute 50.1 percent of the capital stock of CIT-Alcatel, its subsidiary. CGE will own 84 percent of the capital stock of this holding company and Thomson 16 percent. In this way, CGE's 12 percent stake in Thomson-Telecommunications will be paid by Thomson's 16 percent stake in the new holding company (see chart at the end of article).

Management of Thomson-Telecom

"CGE shall receive from the government and Thomson the mandate to manage Thomson-Telecom." The board of directors will consist of 10 members, four appointed by the government, three by CGE, and three by Thomson. "Thomson commits itself to voting in the same way as CGE in all general stockholders meetings and on the board of directors."

"CGE shall be remunerated for its general management services and Thomson for its international services by payment of a fee computed as 0.5 percent of Thomson-Telecommunications annual combined volume of business before taxes." In 1968, this entire 0.5 percent will revert to CGE.

Between now and 1987, CGE commits itself to transfer to Thomson the number of shares of capital stock required to raise the latter's 16 percent stake in the holding company controlling CIT-Alcatel to 40 percent, if it so desires.

Other Interested Sectors

CGE will sell Thomson its 72 percent interest in SINTRA [New Radio Engineering and Manufacturing Company], payable in three installments over a 3-year period with annual interest. But SINTRA's civil radiocommunication, teletype, and facsimile transmission activities will remain with CIT at a price to be determined.

a. General Public

CGE will sell Thomson its approximately 100 percent interest in Cepem for a price of some 130 million francs.

b. Mail Sorting

Thomson will sell to a company to be designated by CGE its nearly 100 percent interest in HBS at a price of 130 million francs.

c. Components

Thomson will control all electronic components and electron tube operations for the two industrial groups.

d. The silicon semiconductor business will be assigned to a special company in which Thomson holds a majority interest and in which CGE will hold an interest not requiring an appreciable financial outlay on its part, it being understood that CGE and Thomson will seek other possible partners, notably Bull initially.

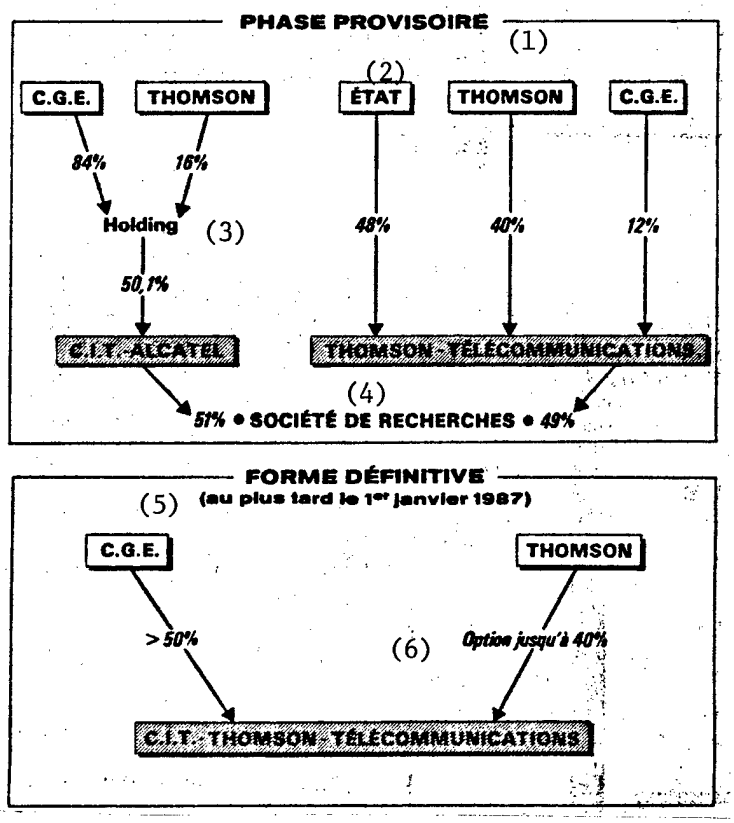
e. Quartz and filter operations will be handled by CEPE [Electronics and Piezoelectric Company], a Thomson subsidiary, to which CGE will transfer its Alcatel Electronic Quartz subsidiary.

There are several scheduled exceptions, however. For instance, the following activities will remain a CGE responsiblity: connectors, flat liquid-crystal screens, electroluminescent diodes, and optical semiconductors.

In the protocol of intention, the two parties clearly stated that their agreement cannot be implemented without "ample governmental support." In addition to the 720 million francs in capital for Thomson-Telecommunications, they are requesting a "participating loan" of 250 million francs from the government. When Thomson-Telecommunications and CIT-Alcatel merge on 1 January 1987, the government will transfer to CGE its holdings in Thomson-Telecommunications in exchange for shares of stock issued by CGE, which it should be remembered is a nationalized industrial group.

"The PTT [Postal and Telecommunications Administration] shall continue to purchase from Thomson-Telecommunications and CIT-Alcatel the very same percentage of its supplies and equipment as ordered from them in 1982.... The current share of research and development funds received from the government shall be maintained as a minimum."

Lastly, the two parties have provided an "escape clause." "If for reasons beyond the control of both parties, the merger between CIT and Thomson-Telecom cannot be achieved by the scheduled date, i.e. before 31 December 1986, the government shall repurchase from Thomson and CGE their respective shares in Thomson-Telecommunications on the basis of the net assets."



Key:

1. Provisional phase
2. Government
3. Holding company
4. Research company
5. Final form (by no later than 1 January 1987)
6. Option of up to 40 percent

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FRENCH CNRS TO GET 1.99 BILLION FRANCS IN 1984

Paris ELECTRONIQUE ACTUALITES in French 21 Oct 83 p 3

[Article by RV: "CNRS Program Obligational Authority for 1984 Totals 1.992 Billion Francs"]

[Text] Pierre Papon, managing director of the CNRS [National Center for Scientific Research], held a press conference in Paris on 11 October, at which he revealed that his agency's total program obligational authority for 1984 would amount to 1.992 billion francs, a 9.2 percent increase from 1983. Some 337 million francs (up 4.6 percent) of that funding will be for "medium" items of equipment, 159 million francs (up 15.2 percent) for major items of equipment, and 93 million francs (up 32 percent) for computer equipment. CNRS outlays ("payment credits") for 1984 will total 7.537 billion francs, an increase of 9.2 percent from 1983.

Papon also announced that the center is going to organize a large scientific exposition with communication as its theme. He explained that it will be held in Paris in May 1984 and highlight the contributions science and technology have made to communication.

In another connection, Papon said he considered increased scientific exchanges between European laboratories to be a priority effort which should lead little by little to formation of a "veritable European scientific space." The CNRS will submit to its European partners a proposal for the launching of "cooperative" research projects devoted to subjects of common interest.

In the microelectronics field, the CNRS is preparing to establish a laboratory dealing with materials for III-V components. This laboratory will be in Bagneux. It will operate in collaboration with the CNET [National Center for Telecommunications Studies].

Papon reported that Midi-Robots, the first CNRS robotics affiliate, was currently being formed in Toulouse.

He also indicated that his organization was negotiating multi-year agreements with certain French regions. These agreements will specify what fields of research are to be developed pursuant to the agreements. Moreover, the CNRS is going to enlarge the scope of its agreement with the CEA [Atomic Energy

Commission]. Cooperation between the two agencies will no longer cover solely nuclear and particle physics but nuclear reactor fuel reprocessing as well.

A draft agreement is to be signed between the CNRS and China's Academy of Science. It is expected to include a provision defining the key sectors of cooperation--particularly in the physical sciences for engineers--between the two organizations. "We want to make this an exemplary collaborative effort," Papon emphasized.

The CNRS recently created several "forward-looking study groups" to prepare future programs for the center. Subjects assigned to these groups included: signal processing; chemistry, biology, and data processing; communication: image and sound, texts and the written word; and laser applications. These groups are charged with duly submitting recommendations for action programs to CNRS authorities.

Lastly, it should be noted that in 1984 the CNRS will initiate an interdisciplinary research program on the theme "technology, labor, employment, and way of life," plus another program on the history of science and technology.

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CONTENTS, VALUE OF FRENCH S&T DATA BANKS EXAMINED

Paris L'USINE NOUVELLE in French 22 Sep 83 pp 116-122

[Article by Nicole Noelle: "Users Talk. Technical Data Banks"]

> [Text] To obtain accurate information right away, and in all fields, there is only one way: data banks. Yet, very few companies have been using them until now. But those who have tried them can no longer do without!

There are no more than 1,500 to 2,000 data bank users in France. The documentation departments which use them on behalf of research and development departments belong to large enterprises in leading sectors. Very few users are small or medium-size enterprises.

Why are there so few users? According to Michel Henry, president of the French Association of Data Base and Bank Producers, there are two reasons. First, French psychology: "In our country," he points out, "we learn to have knowledge, not to look for it!" The second reason has to do with the price of inquiring: "French enterprises are not used to pay for information." Now, obtaining information from a data bank results in an immediate and visible cost. However, these two reasons alone do not explain the lack of enthusiasm of non-user enterprises.

Do the products offered meet their needs? A data bank is a collection (a file) of bibliographic, documentary, factual or numerical information concerning a given discipline, all the data being computerized and available from a distance through telephone networks (Transpac in France, Euronet in Europe, Tymnet or Telenet in the United States, etc.).

"Lack of Coordination Among Information Retrieval Services"

There are over 1,000 of banks on line that can be contacted from anywhere in the world; most of them are U.S. based, and many of them deal with economy, finances and marketing...

The French banks--some 80 are on line and accessible without restrictions--deal mainly with sciences and technology. They provide bibliographic information (references of articles or theses). There are no or very few banks providing scientific numerical data (a few provide economic numerical data). This

lack is strongly felt among users. At Roquette Brothers, a large "consumer" of bibliographic data, Robert Stern, in charge of the central documentation department, is waiting with some impatience for numerical data to become available: "Data that we could use directly would be far more useful..." But we should not delude ourselves. Managing figures is going to be a lot more complicated than managing bibliographic data. "Teletype" type terminals will no longer be adequate...

The content of the banks is not the only obstacle. The lack of coordination between information retrieval services is also strongly felt by small users. The retrieval service provides data-processing and marketing support to the banks. While it is easy to access the retrieval service (through a telephone connected to a terminal; all the user had to do is to dial his personal code number), making inquiries to a bank is more complicated. Despite the present efforts of information retrieval services, there is no coordination. At the start, they each developed their own software with keywords and thesauruses. The result: whereas users can acquaint themselves with a given software within two or three days, it takes several months of regular practice to know their intricacies and make full use of a bank's content. Because of this problem, Claude Mazeas, in charge of the documentation department at Bertin, decided not to expand the range of his information retrieval services... The same is true of all small users. Only very large organizations, like the ARISTs [Regional Scientific and Technological Information Agencies] and Chambers of Commerce, which act as interfaces between data banks and non-computerized small or medium-size enterprises, or again specialists, who practice daily, manage to gain expertise with different softwares... However, the average time of use is only a few hours per month, four or five, no more...

Buying equipment is no obstacle. The investment is practically nil. Existing data-processing equipment, compatible teletype terminals, etc., are adequate. All that is needed is to add an RS-232 or V-24 interface, a 300 or 1,200 bauds modem (the baud number being the transmission rate in bits per second). Total average cost: between 10,000 and 15,000 francs.

A Definite Gain of Time

The display terminal is indispensable only to visualize chemical formulas or compounds, and the plotting table to access directly economic data banks (graphs). Soon, it will also be possible to use videotex terminals of the Minitel type. At present, they are still limited by the fact that their software structure is too simplified to access specialized banks using keywords and thesauruses.

Apart from that, the bill, although high (an average of 500 francs per hour), does not seem to be a real handicap for users. The cost ranges from 300 to 1,000 francs, depending on the bank, the most expensive banks being those that provide numerical or factual data. In addition to these hourly rates, there is the cost of the telephone calls: 10 francs per hour for the Transpac network, 100 francs for a connection with a U.S. retrieval service, plus the normal telephone call from the terminal to the Transpac node.

Using data banks is expensive; but what the user gets, although it is very hard to estimate, is well worth the cost. Time savings (a ratio of 1 to 10 for a

Scientific and Technical Data: Some French Banks

Bank Name	Theme	Number of Ref.	Producer	Information Retrieval Service	Hourly Cost (Francs)
Noriane	Normative Documents	28,000	AFNOR	Questel Telesystems	550
Pascal	Scientific & Technical	4 million	CNRS	ESA-IRS Questel Telesystems Dococean	290 260
Teledoc	Scientific & Technical	75,000	CNET	Questel Telesystems	380
CBAC	Chemistry Biology	500,000	National Center for Chemical Inf.	Questel Telesystems	500
CETIM	Mechanical Industries	65,000	Mechanical Industry Doc. Center	ESA-IRS	450
EDF DOC	Scientific & Technical	230,000	EDF	ESA-IRS Questel Telesystems	380
INPI 1 & INPI 2	Patent rights	770,000	INPI	Questel Telesystems	500
Thermodata	Physical Chemistry, Metallurgy	23,000 plus 3,000 blocks of numerical data	Themodata	Thermodata	Annual admission fee: 250 FF, plus cost of data supplied
Transinove	Patent rights	Patents & technology available for licensing	Transinove International	CISI	600

Key:

AFNOR	French Standardization Association
CNRS	National Center for Scientific Research
ESA-IRS	European Space Agency Information Retrieval Service
CNET	National Center for Telecommunications Studies
CBAC	expansion unknown
CETIM	Mechanical Industries Technical Center
EDF	French Electric Power Company
INPI	French Patent Office
CISI	International Data-Processing Consulting Company

well-defined search), immediate availability of the data, possibility of crosschecking.

Besides, users are convinced. In spite of the initial imperfections we just mentioned, they could not do without data banks. On the contrary, they are asking for more and better banks!

A Few Words

- Data bank: a collection of directly available data usually organized as a data base and covering a particular field of knowledge. Data banks are usually created and maintained by specific institutions, public organizations or professional associations which are then the data bank producers. These data banks are increasingly made available through data-processing consulting companies (SSCI) which act as information-retrieval services via the large national and international teleprocessing networks, and which make specialized languages available to users unfamiliar with data-processing. It should be noted that data brokers are beginning to appear; they act as go-betweens between the retrieval service and the final user.

- Information retrieval services: they provide data-processing and marketing support. They centralize various banks and make access to these banks available to their subscribers. Very few bank producers also take care of the distribution of their own data. In France, there are seven or eight retrieval services, especially G'Cam, CISI, Sligos, Questel Telesystems, which represent the largest concentration of scientific and technical banks (30 or so). In Europe, the largest retrieval service is ESA-IRS (European Space Agency). Among the large U.S. information retrieval services, we should mention Lockheed (150 banks) and SDC [Space Defense Center] (close to 100 banks).

F. Bonijol, Thomson: "A Rigorous Answer Is a Guarantee"

Company Name: Thomson-CSF, Simulators Division
Locations: Cergy-Pontoise (95), Toulouse (31), Trappes (78)
Total Sales: Confidential
Personnel: 1,200
Operations: Civilian and Military

Trappes (78). Accessing Noriane, EDF Doc, Pascal, Inpi, etc.: for Francis Bonijol, standardization engineer at Thomson, it is the certainty of obtaining material results! This is not the case with a search by hand, which must rely on memory and chance. "In half an hour, I can get a pertinent answer on a subject on which I knew absolutely nothing." For instance: "To align systems in space, we have replaced our sight tubes with telemetry lasers. Laser users run the risk of having the light beam projected directly or reflected into their eye."

Whenever a risk is involved, Francis Bonijol writes a specification on the conditions of use. At Thomson, standardization covers not only compliance with specifications, but also the safety of systems and men. "However, I knew nothing of laser safety rules," he added. His first idea was of course to ask Noriane.

He found a single standard that dealt with medical lasers, and therefore was irrelevant. Without breaking his connection with Questel Telesystems, the only information retrieval service to which he subscribes, he went on to ask EDF Doc. The answer provided more information: references for some 10 French and U.S. articles...

Making Better Use of Others' Knowhow

After reading the abstracts on his terminal screen, he decided to order one study made by the French Atomic Energy Commission containing practical advice on lasers of any power. His search did not last much more than half an hour. That document formed the basis of his specification which recommends that users wear special glasses complying with ISO standards (the standards were obtained through Noriane) and advises against wearing or using any shining material or jewelry that could reflect the laser beam.

To this user, accessing data banks means gaining time, solving his problem rationally, and making better use of others' knowhow. It saved him from reinventing the wheel! Indeed, the results of another search in Noriane and EDF Doc prevented the technical department from redoing a complete study on voltage regulation systems. "We wanted," Francis Bonijol explained, "to protect ourselves against transient power-line disturbances that would affect the data-processing equipment (computers and calculators) installed in our simulators. Noriane provided only a few references. But EDF Doc gave me a whole batch. All I had to do what pick a system. They were all described: passive components with a motor, a flywheel, a battery, etc. The original articles contained all the calculations, the powers to be used... There again, all we had to do was adapt these systems to our needs." As a result, a generating motor providing a regulated current and having a one-hour autonomy was installed between the EDF distribution substation and the simulator. "This system is now offered as an option on our simulators."

Francis Bonijol does not use data banks very much: only three or four hours per month. Always at the same rate for the past three years. According to him, this access time amounts to having one person do part-time research work by hand, and he gets information that he could never have obtained through a search by hand! He is positive: "Now that I have tried it, I could not do without it!"

G. Schmidt, Valeo: "Improved Performance Without Additional Personnel"

Company name: Valeo
Location: Saint-Ouen (93)
Sales: 6.9 billion francs
Personnel: 2,700
Operations: Automobile Equipment

Saint-Ouen (93). Accessing data banks amounts to using the competence of experts, obtaining exhaustive and completed work!" according to Gerard Schmidt, in charge of the central documentation department. At Valeo, this department (some 10 people: 3 engineers, 2 technicians plus the administrative personnel) has a lot of responsibilities. It must make knowledge available to the re-

search, production and operations departments! It must channel, analyze and circulate information, and answer all questions from the departments.

Some 200 magazines are reviewed every month (700 for the group). A data-bank was created (10,000 references on automobile equipment). But this is not enough. According to Gerard Schmidt: "To sum up a technology, solve a problem, check some facts... we have access to the scientific and technical data banks of five or six large information retrieval services in France (Questel Telesystems), in Europe (ESA-IRS) and in the United States (SDC and Lockheed)."

In 1980, the group started a campaign on energy savings: the objective was to reduce consumption by 15 percent over 5 years. "We started by focussing on surface treatment lines, especially the phosphating line which consumes a lot of energy," Pierre Cado, engineer at the energy planning department, explained. "And our first step was to see if there were less energy-consuming processes. We found, I believe it was from the CETIM bank, that there was a U.S. process, 'Cool-Phos," which had just become available in France. The Blois plant implemented it--the people in charge were already aware of the problem and were easy to convince--and the Amiens clutch plant tried it. The result was a 50 percent energy saving for the process at the Blois plant, a 10 percent saving over the plant's total consumption, not to mention the room we saved. The process does not require much room. It has only one disadvantage: the product used costs a lot, which reduces the financial savings..." Following this campaign, other processes were implemented, such as low-temperature phosphating.

Today, they are drawing a balance: they analyze the results of that campaign and bring their knowledge up to date. This means that they are again using data banks. Philippe Thiebaut, engineer at the documentation department, is in charge. "I begin by selecting the data banks likely to provide the information I need, and I prepare my strategy, which is the same for each of the banks selected. But I am the only one to access them! When I am through, I then send the results--a list of the references obtained, sometimes with short abstracts of the papers--to Pierre Cado and we review them. In 10 minutes, the CETIM bank gave me 12 references, all in French, which is quite a lot." Among these 12 references, Pierre Cado found new processes, for instance "plaphorisation." He ordered five articles. And that is not all. Philippe Thiebaut is continuing his search with other banks: Pascal, Ispex, Compendex, etc. "We want to get as many references as possible. Nothing on that subject must escape us!"

Still a medium-size user (four or five hours per month), the Valeo central documentation department is about to become a large user.

Gerard Schmidt's objective is to consult the banks not only a posteriori, to answer a question, but also a priori, to provide feedback to the descriptive bulletin and their data base, and to expand the range of investigation to the legal, social and economic fields.

C. Mazeas, Bertin: "Useful, but not Indispensable"

Company Name: Bertin
Locations: Aix-en-Provence (13), Bayonne (40), Plaisir (78)
Total Sales: 165.851 million francs
Personnel: 550
Operations: Mechanics, Automation

Plaisir (78). "Data search through data banks is certainly faster, but not more exhaustive than a search by hand," we were told at the Bertin documentation department (6 people). "On the contrary, certain CNRS manual-search files are more complete than many data banks. But you have to go there..."

These experienced researchers are trained in all research methods: data bank access since 1976, search in outside libraries, which accounts for half their time... Their job is to discover the studies, papers, articles, theses, etc., anything published that could be used by engineers in engineering and technical departments. Engineers do not consult data banks. "We have too much to do to learn the query languages of the various information retrieval services," they point out... Consulting data banks is a job for specialists.

"Today," Claude Mazeas, who is in charge of the documentation department, explains, "we can access six information retrieval services (French, European and German), with a marked preference for the European ESA Information Retrieval Service." Why? It contains the essential of scientific and technical data banks and its query software is quite easy to understand and one of those that perform best. Recently, this information retrieval service introduced the "zoom" control. After an inquiry, all the user has to do is enter the keywords selected. The control lists the keywords for each of the references obtained. In a few minutes, the most pertinent publications are listed...

At Bertin, they do not systematically consult data banks. The search for economic studies is done by hand. "To use a data bank for studies of this type is to look for failure. Very few bases contain that type of information." On the other hand, when what is needed is the maximum of information on a given subject, data banks are precious. "Recently, an engineer from our Aix-en-Provence center asked for all available references on signal compression and transmission," Claude Mazeas explained. "I consulted six or seven banks through ESA-IRS and sent him a listing (titles of the articles, names of the publications, dates of publication and names of the authors) of over 300 references. If we had done that by hand, it would have cost 10 or even 20 times as much," he said.

Data banks are also used to rough out a general study. Take the case of Jean-Paul Ribault, engineer at the energy division. One of his clients, a centrifuge manufacturer, asked him to study the stability of liquid flow in centrifuges. When liquids are separated at a certain speed, vibrations will occur. To solve this problem, Jean-Paul Ribault plans to recalculate the machine dimensions. But before undertaking anything, he wanted to know what had been written on the subject. A broad question indeed--what is the flow pattern of a liquid in a centrifuge?--was asked successively to four banks: Fluidex, the NASA files, MTIS

[expansion unknown], Pascal... A total of over 75 references was obtained. Jean-Paul Ribault asked to see less than half. The final user always has to select what articles may be of interest to him. The search took one hour and a quarter on a very slow system. Actually, Claude Mazeas is still using a former teletype terminal from Texas Instruments to access data banks.

The result of the search? For the moment, Jean-Paul Ribault is studying the articles...

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CSO: 3698/102

BRIEFS

SOVIETS PURCHASE BRITISH CHEMICAL TECHNOLOGY--Last week, Mr Leonid Kostandov, Soviet vice-prime minister in charge of trade, paid a visit to Great-Britain where he had been invited by ICI [International Chemical Industries]. The object of his visit was, among other things, to negotiate the purchase of agrochemical products and technologies. An ICI management delegation (including Mr Harvey-Jones) had visited Moscow early this year. ICI declined to indicate what type of technologies were involved, but it said that "large projects" were being contemplated. In the past, ICI has provided consulting services to the Soviets, especially for fertilizer production. [Text] [Paris CHIMIE ACTUALITES in French 24 Oct 83 p 2] 9294

CSO: 3698/102

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